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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,988	12/10/2003	Kensuke Takai	24500-000009/US	5139

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HARNESS, DICKEY & PIERCE, P.L.C.  
P.O. BOX 8910  
RESTON, VA 20195

EXAMINER
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KHAN, USMAN A

ART UNIT	PAPER NUMBER
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2622

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/17/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No. 10/730,988	Applicant(s) TAKAI, KENSUKE	
	Examiner Usman Khan	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4 and 8-10 is/are rejected.
- 7) ☒ Claim(s) 3, 5-7 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/10/2003</u>  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 12/10/2003 has been considered by the examiner. The submission is in compliance with the provisions of 37 CFR 1.97.

### ***Drawings***

**Figures 9, 10A, 10B, 10C, 10D, 11A, 11B, and 11C** should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Objection***

**Claims 2 - 8 and 11** are objected to because of the following informalities: each of these dependent claims should start with "The". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 2 and 8 - 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamauchi et al. (US PgPub 2001/0045988) in further view of applicants admitted prior art.

Regarding **claim 1**, Yamauchi et al. teaches an image processing apparatus wherein: the imaging device includes a plurality of light receiving sections arranged in rows and columns (figure 1a-1b, 2, 3, 3a, and 4 – 6; and paragraph 0057 CCD array); the plurality of light receiving sections each include a color filter (figure 7a; paragraph 0057 Bayer pattern filter across the entire CCD array); and the image processing apparatus comprises: a horizontal direction interpolation section for performing data

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interpolation in a horizontal direction (figures 30 - 34 horizontal interpolation) using a plurality of pieces of pixel data adjacent to a first pixel position in the horizontal direction (figure 28) to generate a first color signal (figure 30 - 34 horizontal interpolation); a line memory section for storing the first color signal in units of a plurality of lines (figure 30 - 34 line memories; also paragraph 0143 *et seq.* and paragraph 0172 *et seq.*); a vertical direction interpolation section for performing data interpolation in a vertical direction using a plurality of pieces of pixel data (figures 30 - 34 horizontal interpolation), among pieces of data output from the line memory section (figures 30 - 34 horizontal interpolation using line memories), adjacent to a second pixel position in the vertical direction (figure 28) to generate a second color signal (figures 30 - 34 horizontal interpolation output).

However, Yamauchi et al. fails to disclose that a image processing apparatus for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device, wherein: included is a luminance and color difference signal generation section for generating a luminance signal and color difference signals based on the second color signal. Applicants admitted prior art, on the other hand teaches a image processing apparatus for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device, wherein: included is a luminance and color difference signal generation section for generating a luminance signal and color difference signals based on the second color signal.

More specifically, admitted prior art teaches a image processing apparatus for generating a luminance signal and color difference signals based on pixel data which is

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input from an imaging device (figure 9, item 61; also paragraphs 0007 - 0040), wherein: included is a luminance and color difference signal generation section for generating a luminance signal and color difference signals based on the second color signal (figure 9, item 61; also paragraphs 0007 - 0040).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of applicants admitted prior art with the teachings of Yamauchi et al. to increase the speed of image processing as taught in paragraph 0022 of Yamauchi et al.

Regarding **claim 2**, as mentioned above in the discussion of claim 1, Yamauchi et al. in further view of applicant admitted prior art teaches all of the limitations of the parent claim. Additionally, Yamauchi et al. teaches that the horizontal direction interpolation section includes: a horizontal direction interpolation circuit (figures 30 - 34 horizontal interpolation).

However, Yamauchi et al. fails to disclose that for, when the color filters are provided in a Bayer arrangement, outputting an R data signal based on an RG line, outputting a B data signal based on a GB line, and outputting a G data signal based on the RG line and the GB line; and a differential signal output section for outputting a first differential signal based on the R data signal and the G data signal and outputting a second differential signal based on the B data signal and the G data signal.. Applicants admitted prior art, on the other hand teaches that for, when the color filters are provided in a Bayer arrangement, outputting an R data signal based on an RG line, outputting a

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B data signal based on a GB line, and outputting a G data signal based on the RG line and the GB line; and a differential signal output section for outputting a first differential signal based on the R data signal and the G data signal and outputting a second differential signal based on the B data signal and the G data signal.

More specifically, admitted prior art teaches that for, when the color filters are provided in a Bayer arrangement (paragraph 0021), outputting an R data signal based on an RG line (R and G will only be read out in the RG lines), outputting a B data signal based on a GB line (B and G will only be read out in the GB lines), and outputting a G data signal based on the RG line and the GB line (G will be read out from both the RG and GB lines); and a differential signal output section for outputting a first differential signal based on the R data signal and the G data signal and outputting a second differential signal based on the B data signal and the G data signal (paragraphs 0018 and 0029 *et seq.*; CB and CR data).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of applicants admitted prior art with the teachings of Yamauchi et al. to increase the speed of image processing as taught in paragraph 0022 of Yamauchi et al.

Regarding **claim 8**, as mentioned above in the discussion of claim 1, Yamauchi et al. in further view of applicant admitted prior art teaches all of the limitations of the parent claim. Additionally, Yamauchi et al. teaches that the horizontal direction interpolation section generates the first color signal using a filter for weighting at least

one of the plurality of pieces of pixel data adjacent to the first pixel position in the horizontal direction (figure 28 horizontal direction pixels and figures 330 - 34), and the vertical direction interpolation section generates the second color signal using a filter for weighting at least one of the plurality of pieces of pixel data adjacent to the second pixel position in the vertical direction (figure 28 vertical direction pixels and figures 330 - 34).

Regarding **claim 9**, Yamauchi et al. teaches a digital still camera (paragraph 0004 and 0035), comprising: an imaging device (paragraph 0035, CCD or CMOS imager) and an image processing apparatus wherein: the imaging device includes a plurality of light receiving sections arranged in rows and columns (figure 1a-1b, 2, 3, 3a, and 4 - 6; and paragraph 0057 CCD array); the plurality of light receiving sections each include a color filter (figure 7a; paragraph 0057 Bayer pattern filter across the entire CCD array); and the image processing apparatus comprises: a horizontal direction interpolation section for performing data interpolation in a horizontal direction (figures 30 - 34 horizontal interpolation) using a plurality of pieces of pixel data adjacent to a first pixel position in the horizontal direction (figure 28) to generate a first color signal (figure 30 - 34 horizontal interpolation); a line memory section for storing the first color signal in units of a plurality of lines (figure 30 - 34 line memories; also paragraph 0143 *et seq.* and paragraph 0172 *et seq.*); a vertical direction interpolation section for performing data interpolation in a vertical direction using a plurality of pieces of pixel data (figures 30 - 34 horizontal interpolation), among pieces of data output from the line memory section (figures 30 - 34 horizontal interpolation using line memories), adjacent to a



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second pixel position in the vertical direction (figure 28) to generate a second color signal (figures 30 - 34 horizontal interpolation output).

However, Yamauchi et al. fails to disclose that a image processing apparatus for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device, wherein: included is a luminance and color difference signal generation section for generating a luminance signal and color difference signals based on the second color signal. Applicants admitted prior art, on the other hand teaches a image processing apparatus for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device, wherein: included is a luminance and color difference signal generation section for generating a luminance signal and color difference signals based on the second color signal.

More specifically, admitted prior art teaches a image processing apparatus for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device (figure 9, item 61; also paragraphs 0007 - 0040), wherein: included is a luminance and color difference signal generation section for generating a luminance signal and color difference signals based on the second color signal (figure 9, item 61; also paragraphs 0007 - 0040).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of applicants admitted prior art with the teachings of Yamauchi et al. to increase the speed of image processing as taught in paragraph 0022 of Yamauchi et al.

Regarding **claim 10**, Yamauchi et al. teaches an image processing method wherein: the imaging device includes a plurality of light receiving sections arranged in rows and columns (figure 1a-1b, 2, 3, 3a, and 4 – 6; and paragraph 0057 CCD array); the plurality of light receiving sections each include a color filter (figure 7a; paragraph 0057 Bayer pattern filter across the entire CCD array); and the image processing method comprises: a first step of performing data interpolation in a horizontal direction (figures 30 - 34 horizontal interpolation) using a plurality of pieces of pixel data adjacent to a first pixel position in the horizontal direction (figure 28) to generate a first color signal (figure 30 - 34 horizontal interpolation); a second step of storing the first color signal in units of a plurality of lines (figure 30 - 34 line memories; also paragraph 0143 *et seq.* and paragraph 0172 *et seq.*); a third step of performing data interpolation in a vertical direction using a plurality of pieces of pixel data (figures 30 - 34 horizontal interpolation), among pieces of data represented by the first color signal (figures 30 - 34 horizontal interpolation using line memories), adjacent to a second pixel position in the vertical direction (figure 28) to generate a second color signal (figures 30 - 34 horizontal interpolation output)

However, Yamauchi et al. fails to disclose that a image processing method for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device, wherein: included is a fourth step of generating a luminance signal and color difference signals based on the second color signal. Applicants admitted prior art, on the other hand teaches a image processing method for generating a luminance signal and color difference signals based on pixel data which is

input from an imaging device, wherein: included is a fourth step of generating a luminance signal and color difference signals based on the second color signal.

More specifically, admitted prior art teaches a image processing method for generating a luminance signal and color difference signals based on pixel data which is input from an imaging device (figure 9, item 61; also paragraphs 0007 - 0040), wherein: included is a fourth step of generating a luminance signal and color difference signals based on the second color signal (figure 9, item 61; also paragraphs 0007 - 0040).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of applicants admitted prior art with the teachings of Yamauchi et al. to increase the speed of image processing as taught in paragraph 0022 of Yamauchi et al.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamauchi et al. (US PgPub 2001/0045988) in further view of applicants admitted prior art in further view of Examiners Official Notice.

Regarding 4, as mentioned above in the discussion of claim 1 Yamauchi et al. in further view of applicants admitted prior art teaches all of the limitations of the parent claim.

However, Yamauchi et al. in further view of applicants admitted prior art fails to teach that the line memory section thins out the first color signal in the horizontal direction and stores the thinned-out first color signal therein.

The examiner takes Official Notice that it is old and well known in the art to thin out the color signal in the horizontal direction and stores the thinned-out first color signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to thin out the color signal in the horizontal direction and stores the thinned-out first color signal to improve image resolution.

### ***Allowable Subject Matter***

**Claim 3, 5 – 7, and 11** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter for **claim 3**: An image processing apparatus according to claim 2, wherein the horizontal direction interpolation section includes: a four-stage shift register section for sequentially holding a plurality of pieces of pixel data; a first addition section for adding pieces of data output from odd-numbered stages of the shift register; a second addition section for adding pieces of data output from even-numbered stages of the shift register; a first selection section for selecting one of the data output from the first addition section and the data output from the second addition section so as to output one of an R data signal and a B data signal; and a second selection section for selecting one of the data output from the first addition section and the data output from

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the second addition section so as to output a G data signal is not discussed or suggested in any of the prior art that was searched.

The following is a statement of reasons for the indication of allowable subject matter for **claim 5**: An image processing apparatus according to claim 2, wherein the line memory-section includes: a first line memory for receiving the first differential signal and the second differential signal; a second line memory for receiving the data signal output from the first line memory; a third line memory for receiving the data signal output from the second line memory; a fourth line memory for receiving the G data signal; a fifth line memory for receiving the data signal output from the fourth line memory; and a sixth line memory for receiving the data signal output from the fifth line memory is not discussed or suggested in any of the prior art that was searched.

The following is a statement of reasons for the indication of allowable subject matter for **claim 6**: An image processing apparatus according to claim 5, wherein the vertical direction interpolation section receives the first differential signal, the second differential signal, the G data signal, and the data signal from each of the first through sixth line memories is not discussed or suggested in any of the prior art that was searched.

The following is a statement of reasons for the indication of allowable subject matter for **claim 7**: An image processing apparatus according to claim 4, further

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comprising an intermittent clock signal generation section for generating an intermittent clock signal having a frequency lower than a frequency of a clock signal which is input to the horizontal direction interpolation section; wherein the line memory section, the vertical direction interpolation section, and the luminance and color difference signal generation section operate based on the intermittent clock signal is not discussed or suggested in any of the prior art that was searched.

The following is a statement of reasons for the indication of allowable subject matter for **claim 11**: An image processing method according to claim 10, further comprising the step of generating an intermittent clock signal having a frequency lower than a frequency of a clock signal used at the first step, wherein the second through fourth steps are executed based on the intermittent clock signal is not discussed or suggested in any of the prior art that was searched.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Zhang (US patent No. 7,116,819) image processing system with color difference signal and luminance signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Usman Khan whose telephone number is (571) 270-

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1131. The examiner can normally be reached on Mon-Thru 6:45-4:15; Fri 6:45-3:15 or Alt. Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Usman Khan  
04/10/2007  
Patent Examiner  
Art Unit 2622



DAVID OMETZ  
SUPERVISORY PATENT EXAMINER